Development of a Marketplace for Environmental Investments in Oregon's Willamette River Watershed:

A broad-based, market-driven, credit trading and banking program to achieve water quality goals and ecosystem service benefits more cost-effectively and more quickly than possible using conventional regulatory and voluntary approaches.

Submitted by
The Willamette Partnership
In cooperation with

Oregon Association of Clean Water Agencies
Associated Oregon Industries
Oregon Department of Environmental Quality
Clean Water Services
Willamette Riverkeeper
Oregon Environmental Council
Defenders of Wildlife
City of Albany
City of Salem
City of Eugene
City of Portland
Oak Lodge Sanitary District

Watershed/HUC: The greater Willamette Basin includes 12 subbasins at the 8-digit Hydrological Unit Code level, 17090001 – 17090012.

Impaired Waters: Oregon's 2002 303(d) List includes 222 impairments in the Willamette Basin (counting each waterbody segment/parameter/season/criteria as a separate listing).

Information:
David Primozich, Acting Executive Director
Willamette Partnership
PO Box 13026
Salem, OR 97309
503.434.8033
primozich@verizon.net

A web-site has not yet been developed for the Willamette Partnership, but its predecessor organization, the Willamette Restoration Initiative can be seen at oregonwri.org

5/10/2005

2. **ABSTRACT**

The Willamette Partnership will create a marketplace for investments that implement the Temperature TMDL, initially, and otherwise contribute to improvements in watershed health and sustainability. Trading and banking programs will provide the necessary mechanisms and incentives to direct financial and in-kind resources to priority projects at critical locations on a coordinated schedule. Credit trading will let some meet TMDL responsibilities more cost-effectively than otherwise possible. Credit banking will let others document performance of TMDL obligations and provide a product to attract resources to watershed priorities from stakeholders not named in the TMDL. The marketplace will conduct business in several individual credit "currencies" — pollutant units, environmental services (e.g., flood plain or habitat restoration), and will work toward developing a "common" currency that could be used for relative comparisons across projects producing different types of benefits. This marketplace will drive investments to actions that provide the greatest environmental return to the watershed.

4. PROJECT DESCRIPTION

The Willamette Partnership, a 501(c)(3), has reunited the Board and staff of the Willamette Restoration Initiative (WRI), a Governor-chartered effort that developed a strategic plan for watershed restoration. The Partnership is an experienced coalition of conservation, municipal, industry, agriculture, development, policy, and academic leaders who represent the diverse interests needed to develop consensus on innovative conservation policy and action.

(a) Introduction to the Watershed and Existing Management Plans

The Willamette River flows 190 miles through an 11,478 square mile watershed in western Oregon before reaching the Columbia River, and eventually the Pacific Ocean. Seventy-percent of all Oregonians, over two million people, live in this watershed that accounts for about 12 % of the state's total land. Watershed residents live in urban areas such as Albany, Corvallis, Eugene, Portland, Salem, in 89 other smaller cities and towns, and in unincorporated rural communities.

Forested areas, 70% of the Basin, are roughly split between private and public ownership, but USFS and BLM manage most of the eastern watershed. Agriculture land uses, including vineyards, vegetable, nursery, and grass seed, occupy 22% of the Basin's acreage but represent half of Oregon's agricultural output. Wetlands represent 1% of the Basin, down from a historic 10%.

Designated uses for the mainstem and tributaries reflect the diverse watershed activities: Water Supply (public and private domestic, industrial, irrigation, livestock); Fish and Aquatic Life (salmon spawning, juvenile rearing, and migration habitat); Recreation (wildlife and hunting, fishing, boating, water contact); Hydro-power (USACE operates 13 dams, 11 with reservoirs, and has capacity to generate 2,100 mega watts of electricity); and Navigation and Transportation.

Multiple demands on the River's in-stream benefits and stressors from land uses within the watershed have impaired or are threatening designated uses in many parts of the Basin, despite

consistent and dedicated efforts of watershed stakeholders to prevent and mitigate such impacts. In response to 2002 303(d) listings in all 12 subbasins, the Oregon Department of Environmental Quality (DEQ) released the October 2004 Draft Willamette Basin TMDL, culminating a 30-month TMDL development effort conducted with the input of a 20-member multi-stakeholder workgroup, the Willamette TMDL Council. The TMDL focuses on the three main pollutants presenting widespread problems: temperature, mercury, and bacteria.

We've selected **temperature** as the focus of our project for several reasons: impairment in 9 of 12 subbasins; water quality and monitoring data sets are extensive; existing modeling tools permit rigorous analyses; associated science is relatively well-understood; influences over other key parameters; and specific plans exist for addressing sources and causes. The TMDL represents a consolidated temperature management plan for the Basin, as it establishes specific goals for the watershed (see Table 1) that build on previous efforts (see Table 2).

Table 1. Description of the Willamette Temperature TMDL Implementation Plan

Goals and Objectives
• Target all tributaries for full restoration to protect against affects of population growth. • Restore natural stream temperatures in salmonid rearing, migration, and spawning habitat; excessive water temperature is a factor for decline of threatened and endangered fish species. • Address seasonal effects, April through October being the period of concern, although analysis indicates the river naturally exceeds biological criteria during warmest months. • Reduce cumulative impact of 10 major point sources upstream of the Santiam River. • Mitigate hydrological alterations caused by dams, urbanization, and stream channelization as major dams, reservoirs, and loss of riparian vegetation are major causes of river warming.
Actions to Achieve Goals and Objectives on the Mainstem
☑ 10 major point sources will receive wasteload allocations (WLAs) that allow for current flows plus growth, but not to previously permitted design flows (generally 35% growth for municipals and 15% growth for industrials, but some will be lower due to local constraints). ☑ Point sources downstream of the Santiam River will receive WLAs equal to current limits. ☑ Nonpoint sources—urban, agriculture, forestry—need to protect and restore natural riparian vegetation; even though trees will not substantially shade the mainstem river, streamside vegetation provides localized cool water refugia benefits for fish and wildlife. ☑ USACE will be required to do additional analyses on how to reduce impacts of reservoir operations on stream temperatures, including operational changes and structural modifications.

Actions to Achieve Goals and Objectives in the Subbasins
☑ Point sources will often be constrained as is typical in many smaller watersheds where effluent dilution is limited due to lower stream flows. ☑ Nonpoint sources will be required to restore natural riparian vegetation; effectiveness of shading increases as stream width narrows, much of the critical fish habitat is in the foothills.
Table 2. Selected Assessments and Plans Related to Temperature Management
• Willamette Subbasin Plan, 2004 • Oregon Habitat Joint Venture Program, 2004 • Willamette Basin Planning Atlas, 2002 • WRI's Willamette Restoration Strategy, 2001 • Oregon's Assessment of Need for the Forest Legacy Program, 2001 • Factors Influencing Production Of Salmonids & Recommendations For Actions, 1998 • Oregon Biodiversity Project's Oregon's Living Landscapes, 1998

(b)(1&2) Description of Proposed Project

> **"***. . .several Basin NPDES permits will be renewed prior to the TMDL approval. These permits will incorporate TMDL WLAs during the next permit renewal cycle in 2008-2009.* [However,] *the longest-term treatment* [solution] *is restoration of riparian vegetation and growth where needed to provide system potential shade. System potential shade for a small stream may take 10 years versus 20 years for a larger stream. Two examples of milestone goals would be the ability to measure increases in instream shade by 2020 and to achieve instream temperatures that meet salmonid requirements by 2050."* –Ch. 14, Draft TMDL

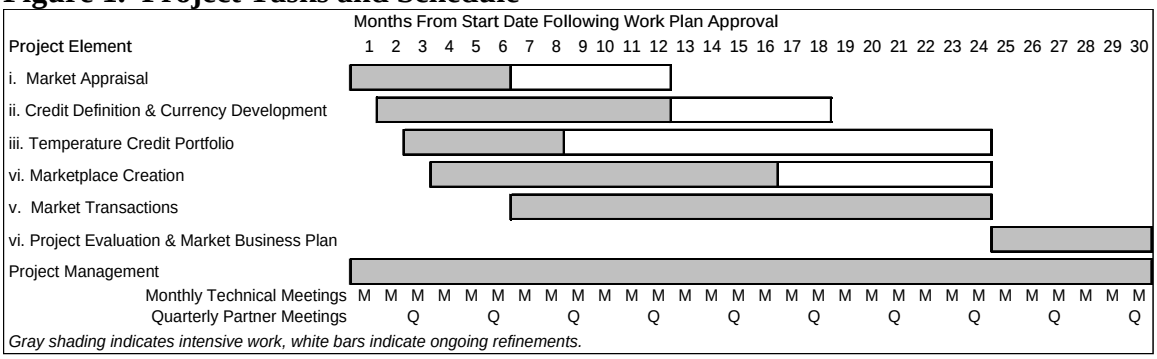
The Willamette Basin Environmental Marketplace will expedite efforts to protect and restore water quality and aquatic habitat throughout the Basin by dramatically accelerating TMDL implementation and cutting milestone achievement times in half. An integrated, market-based approach will use incentive-based mechanisms to direct financial and in-kind resources to priority restoration projects so that thermal load reductions, increases in stream shading, and other ecological improvements proceed faster and more cost-effectively than they otherwise would.

This Project will develop a temperature credit trading and banking program that can accommodate transactions in a variety of currencies representing specific TMDL objectives for offsetting or reducing thermal loads and a range of other ecological services related to overall watershed integrity and function. Creating tradable and bankable commodities that represent distinct watershed benefits will enable stakeholders to develop a Temperature Credit "Portfolio" of dif-

ferent projects and multiple currencies that optimizes investments in watershed restoration. The Marketplace developed in this Project will provide a blueprint for additional trading programs in the Basin, involving other constituents, and for new programs in Oregon and elsewhere.

The Partnership will conduct this effort as a single, integrated Project that follows a series of six stepwise, sequential tasks with some parallel activities, including real credit transactions, as illustrated in Figure 1 and described in more detail below. All activities are designed to complement, advance, and be consistent with key policies and programs identified in Section (e).

Figure 1. Project Tasks and Schedule



The TMDL's significant modeling work, extensive stakeholder involvement, reliance upon and expansion of prior efforts, and explicit mapping of implementation roles and responsibilities means that assessment and planning phases for solving the Basin's temperature problems have substantially been completed and implementation of restorative and protective actions can begin.

(i) Market Appraisal. ***Goal: Reassemble existing information to provide a quantitative and GIS-based projection of the credit supply, demand, and relative costs, by source, location, project type, and temporal pattern.*** The TMDL establishes baselines for credit generation and use. Various plans and GIS tools, including thermal potential modeling, identify general and specific point and nonpoint source opportunities to reduce heat loading or otherwise provide in-stream cooling. We will reorganize this information into a single, credit market-oriented analytical framework to easily and accurately describe key characteristics of the temperature credit market.

The expected relationship between supply and demand, relative costs and benefits, and other ecological values associated with temperature credits will guide creation of the marketplace.

(ii) Credit Definition & Currency Development. ***Goal: Using sound science to support practical and creative approaches, define credits for environmental commodities in 3 currency categories***. The 1st is Kilocalories/day (kcal/d). This is consistent with the TMDL and will allow those with WLAs and LAs, and entities tracking compliance with TMDL responsibilities to trade in a currency that is meaningful to them. The 2nd is a set of other "conventional" credit units. Projects that create temperature credits may create other environmental benefits, and we want to identify and document them within the marketplace. Examples include reductions of other pollutants, habitat creation, wetland restoration, and even carbon sequestration. Providing a way to count and exchange non-thermal benefits will increase economic incentives to invest in projects that benefit the whole watershed and attract participants that might not otherwise have a reason to enter the market. The 3rd is a common currency into which other credits could be converted, to facilitate comparison across different types of credits for relative valuations and provide a unifying management metric. Candidates include an integrated biotic index and habitat equivalency analysis. We will evaluate the options and develop a work plan to design a common currency (it might not be possible to fully complete this within the Project, depending on required effort).

(iii) Temperature Credit Portfolio. ***Goal: Describe the optimal package of temperature credit investments using portfolio theory concepts applied in financial and other markets to organize and guide strategic management decisions for this watershed.*** Temperature credits can be thought of as similar to stocks in a portfolio or mutual fund. Credits have specific costs, may increase or decrease in value, and provide return to the owner in the form of temperature reductions/offsets or other environmental benefits that occur over a specific time period. The Tem-

perature Credit Portfolio for the Willamette will include different types of projects, in different locations, that provide different credit streams over time. This exercise will involve developing a set of criteria to evaluate individual projects and assigned credit valuations. The Portfolio will be assembled from a prioritized listing (and mapping) of projects that represents the optimal distribution of actions, both temporally and spatially, and will guide market participants to projects that most quickly and cost-effectively create temperature credits and/or other creditable benefits.

(iv) Marketplace Creation. ***Goal: Design the physical and electronic architecture of the market and build a functional prototype.*** This will include conducting supporting analyses and drafting documents, agreements, and/or regulatory instruments that address: authorization; trading areas; credit generation and use; monitoring specific to trading; compliance and enforcement; credit verification and certification; public participation and information access; and reporting and evaluation. This will also involve developing specifications for a web-based marketplace and credit registry that will facilitate, document, and track credit transactions using numerical and GIS data bases behind the web-interface. The prototype will support multiple transactions during the grant period and simulate functionality for a watershed-wide market.

(v) Market Transactions. ***Goal: Within the grant period, process multiple real temperature-reducing actions as credit trading or banking transactions.*** To maximize the number and diversity of transactions and participants, we will follow two parallel tracks. First, we will identify and seek to include creditable activities that are already underway or planned for the project period. Second, we will recruit specific stakeholders to invest or otherwise engage in creditable actions that would not have happened during this project, thereafter, or at all. Traded credits will be applied to regulatory or voluntary obligations; banked credits will represent net environmental gains. The Partnership will leverage the full breadth of its members' demand for and ability to

create credits and reach out to non-member stakeholders to identify and consummate transactions. Examples of possible transactions are identified in some of the support letters (see for example OR ACWA's); Clean Water Services tree and shrub planting program for temperature credits is another example. Table 3 lists additional realistic examples that will be pursued.

Table3. Example Credit Sources

- City on Willamette mainstem partners with adjacent industry to restore wetlands and side channels to receive effluent and reduce temperature loads to the river for credit.
- NPDES permittee offsets thermal load with creditable investments in Conservation Reserve and Enhancement Program that accelerates/expands restoration of near stream Ag-land.
- City with water rights on highly productive tributaries delays/reduces/eliminates withdrawals by satisfying water demands in part by effluent reuse and aggressive conservation for credit.
- Credit aggressive restoration and tree planting programs in smaller tributaries that provides shade and decreases pollutants associated with soil erosion.
- Creative discharge systems that connect treated water to river gravels and use the natural cooling of the River to generate credits.
- Constructing or restoring wetlands along the River provides additional cooling, restores summertime flow, and increases wildlife habitat for credit.

(iv) Project Evaluation & Market Business Plan. ***Goal: Evaluate the results of the work conducted under the grant, identify lessons learned, provide guidance for transferring approach to other watersheds, and develop a strategic plan to continue and expand the Willamette Marketplace.*** For details, please see below under (3) Monitoring and Evaluation, (4) Description of Expected Environmental Outcomes, and (c) Description of Outreach Activities.

Project Management & Budget. As seen in Figure 1, we will conduct this project using a collaborative, stakeholder-driven approach that relies on regular workshops and targeted forums to evaluate interim results and milestone deliverables and guide sequential technical and non-technical activities. Roles and responsibilities are summarized in Appendix A. Figure 2 presents a summary of the budget, including allocations by task. More detail is in the Section 5 Budget Form.

Figure 2. Budget Summary

Project Element	*Federal*	*Non-Fed*	*Total*
i. Market Appraisal	$ 43,250	$ 40,000	$ 83,250
ii. Credit Definition & Development	$ 103,800	$ 100,000	$ 203,800
iii. Temperature Credit Portfolio	$ 69,200	$ 52,000	$ 121,200
iv. Marketplace Creation	$ 216,250	$ 160,200	$ 376,450
v. Market Transactions	$ 259,500	$ 202,000	$ 461,500
vi. Project Evaluation & Market Plan	$ 69,200	$ 101,000	$ 170,200
Project Management	$ 103,800	$ -	$ 103,800
	$ 865,000	$ 655,200	$ 1,520,200

(b)(3) Monitoring & Evaluation. We will use these performance and progress measures.

- ***Water Quality Monitoring:*** The TMDL consolidated baseline data for water quality conditions. All existing monitoring stations and sampling programs will continue. These will be augmented as necessary to establish pre- and post-credit conditions at transaction sites. DEQ will continue to evaluate water quality status and trends as part of its TMDL implementation and compliance program. We will perform targeted sampling and analysis to customize existing biological indices (e.g., algae, fish, and/or macroinvertebrates) for this Basin to evaluate biological responses to credit creation and other restoration activities.
- ***Environmental Performance Measures***: A variety of indicators will be used as appropriate for the types and purposes of the credit transactions. Key measures for temperature include kcal/d loads and loading reduction, and % of system shade potential. Others may include measures of % increase in flow, wetlands, and habitat. Biological assessment tools will be used to measure/track changes to the aquatic ecosystem using biological indices (see above).
- ***Implementation Measures for Creditable Projects***: These will be imputed from and serve as surrogates for the environmental indicators used, and will vary as appropriate to the credit transactions. They will be used to help measure short-term progress and forecast long-term gains. They will be quantitative wherever possible. Examples include: miles or acres of tree and shrub plantings; mgd or cfs change in flow; habitat acres or population supported; functional wetland units; flood plain acreage restored; size or percent of hyporheic zone; etc.
- ***Implementation Measures for the Overall Grant Project:*** These reflect technical and administrative aspects of this Project, such as adherence to schedules and budgets, quality of work products, implementing the outreach strategy, and generally achieving project objectives.
- ***Institutional Measures***: These will reflect the strength and breadth of the Partnership and its Marketplace, for example: new members in; success attracting financial and in-kind resources; investments in creditable actions; and queries from other watersheds. Creating the Marketplace and participation in transactions by definition involves new collaborations.

(b)(4) Description of Expected Environmental Outcomes. Project duration, short-term post-Project period, and long-term environmental outcomes resulting from this Project are most appropriately measured against a non-Marketplace baseline, much like we will evaluate credit values versus trading baselines. In our case, measuring environmental outcomes involves the dimension of time as much as it does improvements in environmental indicators. This is because we are expecting to establish a mechanism that will significantly accelerate attainment of the TMDL's temperature goals, and through the transactions that will be implemented during the grant period, we will make the first deposits into the Willamette Temperature Credit Portfolio. The combination of the relatively short duration of this project and the relatively long timeline

(decades) before the ultimate success of many actions can be fully measured means that we must define our expected outcomes in terms of (1) how the Project demonstrates a faster pace of doing the things that lead to temperature improvements compared to TMDL assumptions, and (2) how that pace, if sustained, represents a steeper trajectory of annual progress that will reach the TMDL goals ahead of schedule. Expected outcomes relative to baselines are described below.

- Selected point sources will begin working toward their new WLA within this grant period (06-08) ahead of the 08-09 permit renewal cycle. With a trading program, they will invest in creating kcal/d credits and shorten the WLA compliance timeline by five to 10 years.
- Some point sources will direct their resources to creating shade. Others will invest in shading projects who are attracted by the other types of credits or benefits these actions will generate. Together, these investors will plant trees and shrubs sooner and in greater quantities than without the Marketplace. By itself, this will represent a specific Present Value of % System Shade Potential. Extrapolating these results at a sustained pace watershed-wide under a continuing Marketplace may mean the TMDL could be fully achieved by 2030 instead of 2050.
- Some entities with WLA and LA obligations that may not be interested in or need to trade will move at a faster pace simply because the Marketplace's banking option provides an easy way to document their progress. This will shorten the overall TMDL compliance timeline.
- Faster progress toward the TMDL temperature goals means faster progress toward making the Willamette River and its tributary streams more habitable for salmonids. The Marketplace's economic incentives and Temperature Credit Portfolio will attract and specifically direct investments to projects, including floodplain restoration, that provide localized benefits to salmon (increasing their health and numbers compared to baseline recovery projections).

(b)(5) Consistency With Other Programs/Documents. In addition to the TMDL, and plans listed in Table 1, the Project will support and advance the objectives and recommendations of:

- The Willamette Water Quality Trading Act, ORS 468B.555, 99;
- US EPA policies on water quality trading and watershed permitting, January 03;
- US EPA Region 10, Water Quality Trading Assessment Handbook, July 03;
- Port of St. Helens (aka Port Westward) Temp. Mitigation Project, OR NPDES #111746, 03;
- CWS Temperature & Dissolved Oxygen Trading Programs, OR NPDES #101141-144, 04;
- US EPA guidance and handbooks on water quality trading & watershed permitting, 04;
- OR DEQ Internal Management Directive (policy) on Water Quality Trading, 05;
- OR DEQ 2005-2007 Performance Partnership Agreement with EPA Region 10;
- Oregon & NOAA Fisheries salmonid recovery programs in the Pacific Northwest; and
- Flow management policies and guidelines used by USACOE in operation of Basin dams.

(c) Description of Outreach Activities. The Partnership's Project outreach strategy will employ a range of mechanisms and venues to tailor our involvement and education program to target audiences, purposes of interaction, and content of communication. We will fully access and leverage the Partnership member organizations, Project partners and supporters, and other stakeholder programs, institutional networks, and individual contacts to maximize the number, diversity, and quality of outreach opportunities. Specific examples of organizations and individuals in our outreach network appear in Appendix A & B. Our commitment and capabilities in this area are evidenced by WRI's Board and staff collaborating with multiple stakeholder workgroups involving over 90 people to reach consensus on the *Willamette Restoration Strategy*, and by the 20 member Willamette River TMDL Council and DEQ's effective TMDL public involvement process.

We see concentric but fluid circles of target audiences with different needs and interests. For the core, a recruitment plan will specifically target potential credit buyers and sellers and provide training in market participation. A proactive education program will help a broader group of Basin stakeholders learn more about their watershed's problems and solution opportunities to enhance understanding and support for the Marketplace. Project conference calls, meetings, workshops, and a forthcoming web-site will be the primary means of general outreach to local audiences. Project documents (technical memoranda, meeting summaries, fact sheets, etc.) will vary in detail to maximize accessibility for different levels of technical knowledge and general interest. We will share our story and transfer lessons from our experiences to the larger audience of Oregonians, Northwest and Western U.S. interests, and the national watershed community through our web-site and by proactive participation of Project Team members in state, regional, and national watershed management forums (including ones specific to the TWG program) to attend meetings, present papers, participate in panel discussions, and informally network.

5. Budget

SECTION A - BUDGET SUMMARY			
Watershed Project, Activity, or Work Plan Element	**Federal**	**Non-Federal**	**Total**
i. Market Appraisal	$ 43,250	$ 40,000	$ 83,250
ii. Credit Definition & Development	$ 103,800	$ 100,000	$ 203,800
iii. Temperature Credit Portfolio	$ 69,200	$ 52,000	$ 121,200
iv. Marketplace Creation	$ 216,250	$ 160,200	$ 376,450
v. Market Transactions	$ 259,500	$ 202,000	$ 461,500
vi. Project Evaluation & Market Plan	$ 69,200	$ 101,000	$ 170,200
vii. Project Management & Grant Administration	$ 103,800	$ -	$ 103,800
Totals	$ 865,000	655,200	$ 1,520,200

SECTION B - BUDGET CATEGORIES								
	Watershed Project, Activity or Work Plan Element							**Total**
Budget Categories	**i**	**ii**	**iii**	**iv**	**v**	**vi**	**vii**	
a. Personnel	$ 8,582	$ 20,598	$ 13,732	$ 42,912	$ 51,494	$ 13,732	$ 44,784	$ 195,834
b. Fringe Benefits	$ 5,908	$ 14,178	$ 9,452	$ 29,538	$ 35,445	$ 9,452	$ 37,320	$ 141,293
c. Travel	$ -	$ -	$ -	$ -	$ -	$ -	$ 9,000	$ 9,000
d. Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
e. Supplies	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,500	$ 1,500
f. Contractual	$ 65,790	$ 161,895	$ 93,263	$ 289,148	$ 356,738	$ 142,263	$ -	$ 1,109,097
g. Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
h. Other	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
i. Total Direct Charges (sum line a-h)	$ 80,280	$ 196,671	$ 116,447	$ 361,598	$ 443,677	$ 165,447	$ 92,604	$ 1,456,724
j. Indirect Charges	$ 2,970	$ 7,129	$ 4,753	$ 14,852	$ 17,823	$ 4,753	$ 11,196	$ 63,476
TOTALS (sum line i-j)	$ 83,250	$ 203,800	$ 121,200	$ 376,450	$ 461,500	$ 170,200	$ 103,800	$ 1,520,200